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WHERE SOME RARE BUTTERFLIES FLY

BY JAMES EDWARD COTTLE

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Every entomologist knows the call of the wanderlust and at some time or other most of us have been able to answer that call. They say it's nature's yearning to explore and our inherent desire to realize the excitement of quest. However, whatever it may be, last spring, to put it brusquely, my feet began to itch for the long trails and my mind sought the solace of far distant meadows. Is it not wonderful that in retrospective, one can vision the laurel on the hills and picture the gray sage upon a painted desert? Albeit, to my mind, this but formed a background of what I really craved to see, and that was the habitats of certain rare butterflies; shall we call them flying treasures of the air which all entomologists love to look upon? The question was could I really find them?

With these thoughts in mind, I packed my kit and resolved to obey my summons. Hence it was that on June 10 last, I turned my steps toward Spring Mountain, near St. Helena, in Napa County, California, where to find *Argynnis lilliana* Hy. Edw. in its native type locality. I had been there before, years ago, with Prof. Owen and had also trod those same butterfly paths with Dr. Hans Herman Behr, late Curator of the California Academy of Sciences in San Francisco, so I knew my locality. However, fate was somewhat against me and the collecting was poor. Owing perhaps to a scarcity of rain, I only took 16 males and 2 females. The females of the species were really what I had made the trip for. The habits of *lilliana* differ somewhat from most *Argynnis* I have collected, in that when disturbed from among the brush, they fly upward, but once again settle down from whence they came. Anyone desiring *lilliana* should go to St. Helena and take the road to Spring Mountain, climbing up about four miles.

Upon returning home from Napa County, I decided to go to Moro Beach (near Atascadero) in San Luis Obispo County to look up a little blue butterfly, a Lycæninæ, called *Plebeius icarioides moroënsis* Stern. This race had been named recently from types and paratypes which I thought were not in the pink of condition. Arriving at the town of San Luis Obispo on June 26, I was lucky in securing transportation over to the beach with a mail carrier. Blue flowering lupine grows along the ocean's edge in patches among the sand dunes and I found the butterfly hovering over these. My best catches were made north of the little hotel, and on windy days collecting would be difficult except in sheltered spots. Without much difficulty I secured some 25 pairs in good or indifferent condition, so I judge a better collecting time would be some ten days to two weeks earlier, depending upon the condition of the lupine. Personally I prefer to kill delicate butterflies in a quick cyanide bottle because if specimens of this sort are "pinched," it is apt to make them look different; maybe like something new. Of course I am no authority.

Feeling fit and fine after my trip to Moro Beach and having partaken of a birthday cake sporting 70 candles, (Yes! I am that old), I decided to attempt a real collecting trip and into a region which was new to me. This time it was to be desert environment, so on July 10 I boarded the sleeper at Oakland for Ruby Valley, Elko County, Nevada. Wells, Nevada, was the getting-off place and again Uncle Sam's mail service stood me to good use, because Ruby Valley is 40 miles to the south. Arriving in the valley, which is an entomological oasis, I ventured up to the ranch of Mr. James Wright, meeting his estimable wife at the door, and although a total stranger, was most hospitably received and made welcome. I shall always remember the twelve happy and interesting evenings spent with Mr. and Mrs. Wright. Their youngest son, Jimmy, only four years old, could ride a horse like a buckaroo and help his father round up a pony! Ruby Valley and certain locations in northern Nevada may prove to be the metropolis for *Argynnis gunderi* Comst., as I took the species plentifully along the Franklin Slough near the ranch. In this district *gunderi* shows no superficial relationship to *snyderi* Skin., which evidently does not

occur in this locality. Several years previously I had taken one example of *gunderi* in its type locality in Modoc County, California. Northern Nevada west to Modoc County in California represents the same character of territory, so one could expect a similar insect fauna. Along with *gunderi* I also took *Argynnis artonis* Edw. commonly. *Artonis* should not longer be synonymed under *eurynome* Edw., as they are quite distinct, though probably related. Among other butterflies taken were a number of *Cercyonis* which look like *wheeleri* Edw., but were without the joined ocelli. Whether *wheeleri* represents a valid separate listing remains to be seen, as it has ever since it was named. Mr. E. L. Bell, our skipper specialist, would do well in Ruby Valley. I understand he missed out on location near Reno last year. Because of the unusual rhopalocera found in this section, I imagine many heterocera could be taken here which would be new. This is a special tip to my good friend Dr. John Comstock of Los Angeles.

On July 23 I returned home, being well pleased with my desert success. There still remained several weeks of seasonal collecting, so my thoughts and fancy turned to Mt. Hood in Oregon as a likely place. In the West to find any more collecting late in July one must either go very high or else strike out northward. Even in Canada the butterflies by August 10 cease to be found in any numbers. The reason being that, though the days may be warm, the nights freeze them out. My series of *Argynnis* lacked *erinna* Edw. and I had read that it could be taken on Mt. Hood, so I decided to make this comparatively rare race of *eurynome* the object of my final 1931 excursions. Once more bidding my patient wife good-bye, I left by train for Portland and from there took stage to Mt. Hood, arriving on July 26. With headquarters in Battle Axe Inn at Government Camp, I found the proprietor, Mr. Henry F. Villiager, and his wife to be very accommodating. The town or rather post office only, is practically on Mt. Hood's slope and conditions looked pretty good. However, the first few days of tramping around were very discouraging. No *erinna* in the immediate neighborhood. At Summit Meadows, adjoining a nearby resort called Swim, I took some *Argynnis* quite near *rhodope* Edw., or perhaps they are only *sakuntala* Skin., and a series of *Plebeius*

argyrotoxus Behr. This latter is the nearly spotless northern representative of *anna* Edw. and should be removed from its present synonymical position under *anna* to a racial classification. This pretty little blue has mystified collectors for years because of the subordination of its name. Becoming disgusted and legsore from hiking around locally and not seeing any *erinna,* I decided, like Richard the Third, to beget myself a horse and try altitude ascents on Mt. Hood proper. Hiring that old nag panned out to be the best investment I ever made. My campaigning from then would read about as follows: Arise early, eat my breakfast, light up a cigar, ask for mail and mount the steed, proceeding up the mountain. No trotting or galloping, mind you, but just a gentle walk (mostly for the horse) and for me a ride through the perfume of the mountain flowers and into the freshness of the tall pines at 9000 feet elevation. Nature was at her best up there at this time of year and I don't believe the scenery could be equalled elsewhere. On the third day of these alpine excursions, I was coming back to a tree where I had tied the horse and discovered that he (or was it she) had broken the rope and decamped. Quoting unusual paragraphs from the Bible and having visions of paying for a lost horse, I trudged on down the trail in pursuit. About a mile from where I had tied him, I saw the old buzzard quietly feeding on some bunch grass just off the path. Cautiously sneaking up, I grabbed his halter and heaved a sigh of relief. In looking around the place I saw one butterfly. Hurrah! It was a perfect specimen of the rare *erinna.* The old horse had brought me right to the spot which had been the object of my search for six days! Well, that night I saw to it that he got an extra mug of oats—and he deserved it. After that I made several ascents to the location and netted a good series of those *Argynnis.* The Mt. Hood trip was a success like the others. I had accomplished my objective, so returned to Hayward, refreshed in mind and body and rejuvenated, all of which goes to prove the old adage that "A man is as old as he feels."

THE TERMITES OF NEVADA

BY S. F. LIGHT

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Very little is known of the termite fauna of Nevada. I know of but two species reported in the literature, *Termopsis nevadensis* by Hagen (1893) from the "western border" (near Lake Tahoe) and *Reticulitermes tibialis* by Banks and Snyder (1920) from "Nevada" (Elko?).

The records of the Termite Investigations Committee add somewhat to the picture. *R. hesperus* Banks was collected by C. R. Anderson at Big Canyon (Washoe County?). A. L. Pickens and O. L. Williams of the Termite Investigations Committee staff found the three above mentioned species common in and about Carson City and C. M. Murphy has recently sent us a collection of *R. tibialis* from Montello in the northeastern part of the state very near the Utah border and one from Granite Point.

A recent trip to southern Nevada for the Termite Investigations Committee with a view to estimating the probabilities of termite damage at the Boulder City site and the type of construction indicated furnished an opportunity to make a hasty collection of the termites of the region and to get some picture of their biology and distribution.

Although but parts of two days were spent in the field results of considerable interest were attained. Six species were collected as follows: *Kalotermes (Neotermes) simplicicornis* Banks; *Reticulitermes tibialis* Banks; *Amitermes arizonensis* Banks; *Amitermes coachellæ* Light; *Amitermes wheeleri* Desneux (sensu Light 1930); *Amitermes californicus* Banks. Of these six species only *R. tibialis* had previously been known from Nevada and these collections extended the known northerly range of each of the five species by from one hundred to two hundred miles.

Neither *Kalotermes minor*, *Kalotermes hubbardi*, nor *Heterotermes aureus* was found, although numerous situations favorable for each of them were investigated. I have found all three of these species abundant in the vicinity of Yuma and *K. hubbardi* and *Heterotermes* were found by Pickens in the Colorado River Valley near Blythe. It would be of considerable

interest to trace the northerly limits of range of each of them in the Colorado River Valley.

The termite fauna of Nevada includes, therefore, at least eight species. This is a purely geographical assemblage of species and without any ecological unity. We may expect to find *Termopsis nevadensis* confined to the moister, forested areas of the northwest. *R. hesperus* is probably restricted also by the moisture factor but with a wider range due to its subterranean habits. *R. tibialis* may be expected to occur in local areas in all parts of the state where moisture conditions are more or less intermediate between those requisite to the existence of *R. hesperus* and those found in the desert. Even here they will appear in wash associations as seen near Las Vegas (Winterwood Ranch).

The termite fauna of southern Nevada consists largely of species common to the Mohave and Colorado deserts, species which will almost certainly be found in the unknown fauna of the northern half of Arizona and most of which do occur in the fauna of southern Arizona. It seems safe to predict that this fauna will be confined to the small southern portion of the state whose meteriological and topographical features are in agreement with those more southerly regions.

One especially interesting outcome of the trip was the discovery of a nest of the recently described species *Amitermes coachellæ* Light (1930) containing not only the hitherto unknown alates but a physogastric queen with eggs and early instars. This was my first finding of *Amitermes* alates in the colony and the first for this whole area. The only other nest series known to me, unreported as yet, were taken in the Davis Mountains in Texas. As for the physogastric queen, I believe this is the first one taken for this genus in North America, if not in Pan-America.

Kalotermes (Neotermes) simplicicornis Banks is extremely abundant in the washes and mesquite grown sinks of the Las Vegas Basin (2600 feet) and in the Colorado River Valley (Vegas Wash) some six miles above the Boulder Dam site. Here as elsewhere the buried dead branches and roots of mesquite are its most important reservoir. In one area, near the Winterwood Ranch, however, living clumps of shadscale

(*Atriplex* sp.) were practically all infested with this species which seems to obtain its moisture from the juice of the plant which its activity destroys. Whether the termite groups in such plants are separate colonies is a moot question as yet. It is common to find the termite workings in dead plants occupied by ants (*Cremastogaster*). If they do not move out with the failing of the plant juices it seems probable that the weakened termite group is finished off by the invading ants.

I am using the older subgeneric name (*Neotermes*) but in a paper soon to go to press a new subgenus is erected to receive this unique species.

One of the puzzling points in the biology of this most interesting species is the location of the reproductives of the colony. Although several hundred colonies have been examined no supplementaries have been found and in only one case, a colony hastily examined near Tucson, has a royal pair been found. This condition held in the Nevada colonies, no royal pairs or supplementaries being seen in the many colonies opened.

Equally puzzling has been the point of location of the primary royal cell and pair of incipient colonies since heretofore none of these has been found. It was interesting to find two such royal pairs of incipient colonies. They were in cells in the base of a dead clump of *Atriplex* in the wash near Winterwood Ranch. The absence of eggs or young indicated that they were from this year's swarm, which had evidently emerged here, no alates being found in the colonies, although in the Vegas Wash the colonies were crowded with alates.

Reticulitermes tibialis Banks was taken both in the vicinity of Las Vegas and in the Vegas Wash near river level. Near Las Vegas it was found in dead cottonwood roots near an irrigation ditch and in Las Vegas signs of its attacks on poles were observed. Near the Winterwood Ranch it was common in wood buried in drifted sand on the edge of the wash. In the Vegas Wash it was common in partly buried drift wood. The abundant drift wood along the banks of the Colorado showed no signs of termite attack whether because of frequent flooding or because the extremely fine silt is unfavorable.

Amitermes arizonensis was encountered in its characteristic situation on the sloping rocky approaches to the mountains

which rim the basin in which Las Vegas lies. Signs of its activities were seen in the form of covered ways over desert shrubs and the light areas on shrubs due to its eating off the thin, weathered, outer layers. Several workers and a soldier were taken on a hillside shrub (? *Encelia*) growing in a tiny soil pocket in a crevice of the solid rock of a gulch just back of the Frenchy Mine.

Amitermes coachellæ Light (1930), recently described from San Gorgonio Pass and the upper Coachella Valley, was the only termite found on the proposed site for Boulder City. It was also taken near the Winterwood Ranch in the Las Vegas Basin where it was attacking dead mesquite branches partly buried in sand.

The single collection taken at the Boulder City townsite was from a large colony in a well formed nest similar to that discovered by Castle in the Coachella Valley (Light 1930). The nest was buried from six to fifteen inches deep under a broad, flat, partly buried stone in a small, sandy draw. The galleries immediately below the stone and attached to it were crowded with the hitherto unknown alates of this species and last instar reproductive nymphs. Scattered smaller chambers contained young of the first three instars and one contained eggs. But few workers were present at this level. An intermediate nest contained many workers and some alates and reproductive nymphs of various stages. Only a single soldier was taken here and none immediately below the stone. The lowest nest, some fifteen inches below ground, contained large numbers of soldiers and numerous workers but no alates or nymphs were seen. Every gallery when opened was found guarded by one or several soldiers. In its center in a broad flat royal cell was a physogastric queen with an abdomen about 15 millimeters long and 4.5 millimeters in diameter. This is the first queen of this species taken, and the first, I believe, for the genus in North America if not in both Americas.

Soldiers of the *Amitermes* species are notably few in proportion to workers, at least in the foraging groups from which collections are ordinarily made. This finding shows them to form a higher percentage of the colony than had been believed,

their function being apparently largely the guarding of the royal pair.

The smallest American species of *Amitermes*, very similar to *A. coachellæ* in type of soldier mandibles but very much smaller than that species, was described by me (Light 1930) under the name *A. wheeleri* Desneux on the basis of determinations by Banks (1920). Recent studies of Banks' material and one of Desneux's cotypes leave little doubt that it is an undescribed species quite different from Desneux's species which is probably the *Amitermes californicus* of Banks (1920). This species will be named and the hitherto unknown alates described in a forthcoming revision of the genus. Until such time it seems convenient to retain the older name. This species was taken but once in Nevada, on a down fence post partly buried in sand near the Winterwood Ranch.

Amitermes californicus Banks is probably a synonym of *A. wheeleri* Desneux as pointed out above, but pending final investigation of type material Banks' name may be retained. This species was not found in Las Vegas or vicinity but was very abundant in a dryer, more gravelly wash emptying into the Vegas Wash at an elevation of about 800-900 feet. Late reproductive nymphs were present but no alates.

PRELIMINARY NOTE ON PÆDOGENESIS IN A CECIDOMYIID

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The writer's attention was attracted to an abundant infestation of *Lupinus nanus* by an undetermined cecidomyiid near South San Francisco in March, 1931. Most of the lupine plants extending over a considerable area had several to many of their leaves distorted to form simple leaf-galls. These were formed by the margins of the opposite sides of a leaflet remaining firmly in contact, frequently along their entire length, the blade of the leaflet then expanding to form a bluntly pointed spindle-shaped gall, which turned pale yellow and translucent.

Several hundred heavily infested leaves were taken to the laboratory and placed loosely in covered containers for observation on March 19 (Lot A). A second lot (Lot B) was obtained

on March 21 and a third (Lot C) on April 1. A daily record of the adult emergents was kept for each of these lots, while from time to time a number of galls were opened for observations on the eggs, larvæ and pupæ.

Following is a summary of the pertinent data relating to (1) the time of emergence, (2) the total number of adults, (3) the sex ratios, for Lots A, B, and C respectively.

(1) The first emergences occurred during the third, second and first days after the material was brought into the laboratory, in sex ratios (males to females) approximating 2:3, 5:0, and 6:5.

(2) The daily maximum number of emergences occurred during the eleventh, eighth, and sixth days, in ratios approximating 1:2, 5:8, and 2:1.

(3) The total number of emergences was 1980, 813, and 324, in the ratios 644:1336, 296:517, and 202:122 respectively.

Shortly after the material of each lot was brought into the laboratory many of the larvæ left the galls and moved about freely in the containers, pupating there later. The greater number, however, remained in the galls until shortly before pupation or after. The detailed observations made on the eggs, larvæ and pupæ were confined largely to those that thus remained in the galls. The following processes, enumerated here without details, were observed:

(1) Viviparous parthenogenetic pædogenesis, in which larvæ produced similar active larvæ.

(2) Oviparous parthenogenetic pædogenesis, in which the larva or pupa produced a single egg, found within the silken cocoon with the quiescent pupa in a number of cases.

(3) Pupation without the formation of a cocoon.

(4) Pupation in which a silken cocoon was formed.

(5) Copulation of the adults.

It would appear that several rare phenomena were observed in this material. The occurrence of pupal oviparous pædogenesis is, in any case, of extraordinary interest inasmuch as it apparently has been reported only twice, at the time of its discovery by Grimm in 1870 in the Chironomid *Tanytarsus* and later by Zavrel. It is hoped that these phenomena may be given more detailed study when sufficient material again becomes available.

NEW RECORDS AND TWO NEW SPECIES OF CHERMIDÆ FROM BRITISH COLUMBIA AND WASHINGTON, WITH BIOLOGICAL NOTES

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The specimens on which this paper is based were received through the courtesy of Mr. Oscar Whittaker, Hollyburn, B. C., and Mr. W. Downes, Entomological Laboratory, Victoria, B. C.

Twelve species representing five genera are included in this report. Two of the species, *Aphalara vancouverensis* and *Hemitrioza washingtonia*, are described as new. For each species, *where definitely known*, brief biological notes are given to facilitate the observation and collection of the immature stages or nymphs. Except where otherwise indicated, these notes have been drawn from observations made by the writer in California and Nevada. Types of the new species are in the collection of the author.

Genus Aphalara

Aphalara rumicis Mally

Specimens. One female and one adult with abdomen wanting, from unknown host, Chilliwack, B. C., July 19, 1925, (Oscar Whittaker); two females, from unknown host, Chilliwack, B. C., July 26, 1925, (Oscar Whittaker).

Host:[1] *Rumex* spp. (Dock). The nymphs occur on the ventral side of the leaves curling the margins under lengthwise to form pseudogalls which turn scarlet.[2]

Aphalara vancouverensis Klyver, n. sp.

Fig. 1.

This species is closely related to the group of several species centering about *A. artemisiæ* Förster and in some respects resembles *A. angustipennis* Crawford. It is distinctly different in certain characters that have been regarded as being of specific significance by Crawford and others and is therefore here described as new.

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[1] This term is here used to denote a host plant from which the immature stages or nymphs have been taken.

[2] Patch, E. M. Notes on Psyllidæ. Maine Agr. Exp. Sta., Bull. 202:217, 1912.

Specimens. Holotype male, FK63.1.1 ♂, from unknown host, and allotype female, FK63.2.1 ♀, from unknown host, Duncan, B. C., June 29, 1922, (W. Downes).

Adults. Length of body on slide, 2.8 to 3.5 mm.; length of fore wing, 2.1 to 2.5 mm.; width of head, .65 to .75 mm. General color gray with a slight yellowish or brownish tinge on the head and thorax and with dark brown to black transverse stripes on the dorsum of the abdomen. The eyes dark brown to black. Tip of antenna black. Genital segment brown. Fore wing semi-opaque and spotted with brown spots and maculæ consisting of several of such spots running together, with the colored areas more numerous distally. Characters of the genus well developed.

Head (Fig. 1, C) as wide as thorax; strongly deflexed. Antenna ten-segmented; about a third longer than width of head; segments four to eight inclusive bearing sensoria.

Thorax strongly arched; without pubescence. Posterior tibia with eight to ten large black teeth at the apex; two claws on the posterior tarsus. Fore wing semi-opaque, punctate, with the points arranged in such a way that they border small circular areas without punctations, the wing spotted with brown areas that each cover one of these, or with several brown areas coalescing to form larger maculæ (Fig. 1, M); wing proportions and venation very similar to that of *A. minutistylus* Klyver.[3] Hind wing relatively large and very delicate in structure; beset with numerous fine points; the venation scarcely distinguishable as irregular rows of points.

Abdomen with the tergites and sternites uniformly and equally chitinized. Genitalia of the male (Fig. 1, K) relatively large, with the lateral lobes longer than the body of the proctiger and with the characteristic hooks of these lobes feebly chitinized; the clasper (Fig. 1, H) with the posterior margin considerably longer in perpendicular length than the anterior margin and terminating in a rounded point; the anterior-mesal aspect bearing a thumb-like process carrying a secondary tooth as illustrated (Fig. 1, G). Genitalia of the female about one-third as long as remainder of abdomen, with the shape and proportions as illustrated (Fig. 1, P).

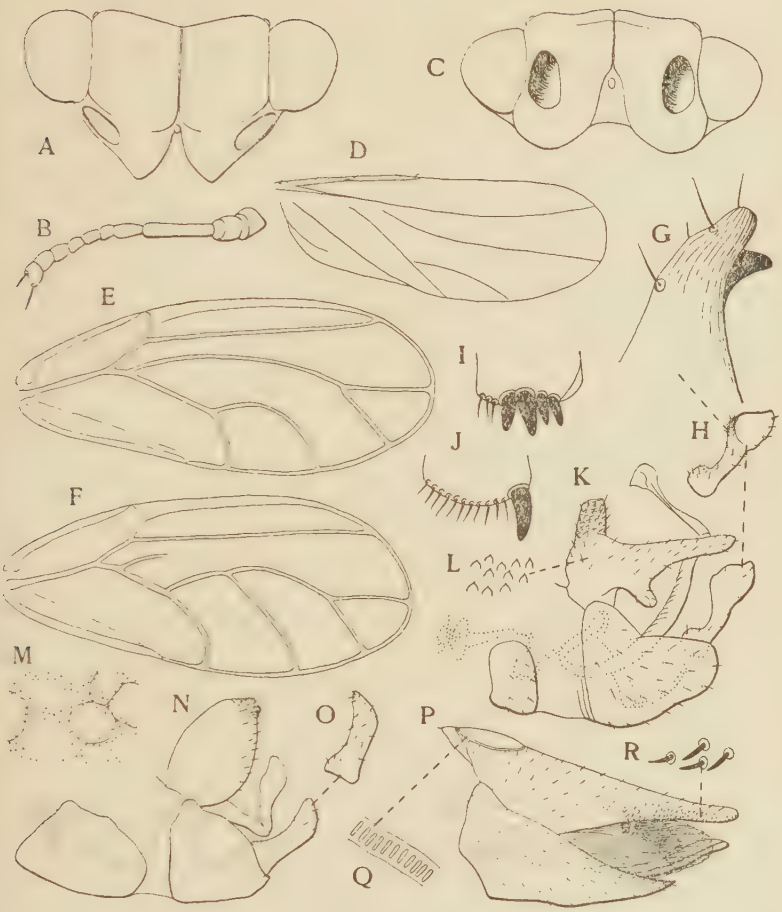
Nymphs. Unknown.

Aphalara nebulosa kincaidi Ashmead

Specimens. One female, from unknown host, Chilliwack, B. C., May 10, 1926, (Oscar Whittaker); one male, from unknown host, Chilliwack, B. C., May 20, 1926, (Oscar Whittaker); one female, from unknown host, Chilliwack, B. C., April 28, 1926, (Oscar Whittaker).

Host (of the species in Europe): *Epilobium angustifolium* (Fire-Weed, Willow Herb); nymphs of the variety

[3] Pan-Pacific Entomologist, 7:138; Fig. 1, L.



Explanation of Fig. 1

Hemitrioza washingtonia n. sp. A, head; B, antenna; D, hind wing; E, normal fore wing; F, fore wing with irregular venation; I, inner aspect of apex of posterior tibia; J, outer aspect of same; N, genitalia of male; O, inner aspect of clasper.

Aphalara vancouverensis n. sp. C, head; G, anterior-mesal process of clasper; H, inner aspect of clasper; K, male genitalia; L, scale-like ornamentation of proctiger; M, detail of fore wing membrane; P, genitalia of female; Q, detail of circum-anal pore ring; R, setæ on apex of dorsal valve.

unknown. There is a probability that the variety should be regarded as a distinct species and that the relationship existing here is similar to that between *Trioza urticæ* (L.) and *T. albifrons* Crawford, both of which have nettle for a host, in Europe and North America respectively.[4]

Genus Trioza

Trioza frontalis Crawford

Specimens. Three males and three females, from *Amelanchier*, Victoria, B. C., April 27, 1926, (W. Downes).

Host: Amelanchier alnifolia (Western Serviceberry). Nymphs taken by the writer at Zephyr Point, Lake Tahoe, Nevada, were found isolated individually, in small numbers on the ventral side of the leaves. These specimens were not accompanied by any great abundance of "white floss-like wax filaments" found on the nymphs of *T. obtusa* Patch, a very closely related species taken on *Amelanchier canadensis* during July in Maine.

Trioza maura Förster

Specimens. One male, from unknown host, Thormanby Island, B. C., August 8, 1925, (Oscar Whittaker); one male and one female, from unknown host, Saanich District, B. C., July 30, 1922, (W. Downes).

Host: Salix spp. (Willow). The nymphs are usually found in small numbers isolated singly on the ventral side of the leaves of a variety of willows. Sometimes they form shallow, blister-like areas in which they apparently remain quiescent for some time. In structure they are oval in outline, 2.5 mm. long and 2.0 mm. broad, flat, and very closely appressed to the leaf. The earlier nymphal stages are very imperfectly known.

Genus Hemitrioza

The single specimen at hand substantiates Crawford's observation that the wing venation even in the same individual may be variable (Fig. 1, E. F.).

Hemitrioza washingtonia Klyver, n. sp.

Specimen. Holotype male, FK73.1.1 ♂, from unknown host, Toppenish, Washington, May 2, 1926, (E. W. Davis).

[4] Klyver, F. D. Notes on the Chermidæ. Part I. Can. Ent., 62:167. Pl. 14. 1930.

Adult male. Length of body on slide, 2.0 mm.; length of fore wing, 1.8 mm.; width of head, .6 mm. General color of entire body uniform medium brown. Eyes dark brown. Genæ lighter than the general color. Tip of antenna black. Wings uniform brown (including veins), semi-opaque, shiny; hind wings iridescent. Agreeing fairly well with the characters of the genus as defined by Crawford except that the head is not much narrower than the thorax, the eyes are not proportionately very small, and the hind tibia has four, instead of three, apical spines or teeth on the inner aspect.

Head (Fig. 1, A) strongly deflexed. Antenna (Fig. 1, B) ten-segmented with the third segment nearly as long as segments four, five, six, and seven combined; antennal sensoria obscure; antenna scarcely as long as width of head.

Thorax moderately arched; without pubescence. Posterior tibia with one large black tooth and a comb of setæ (Fig. 1, J) on the outer aspect and with four black teeth, two of them large and two distinctly smaller, on the inner aspect (Fig. 1, I). Fore wing semi-opaque and punctate throughout with a suggestion of alar radulæ in the two marginal cells and between Cu_1 and $M_3 + {}_4$; normal venation as in Fig. 1, E, with irregular venation, *in the same individual,* as illustrated in Fig. 1, F. Posterior wing (Fig. 1, D) distinctly brown, with the venation as illustrated, developed for the most part as little more than streaks of brown along which the punctations that beset the entire wing membrane are arranged in more or less definite but irregular rows.

Abdomen with the tergites and sternites uniformly and equally chitinized; with small pleurites at the lateral extremities of tergites four, five, six, and seven. Male genitalia relatively small (Fig. 1, N, O); the proctiger oval in lateral view, with sparse pubescence; the clasper simple in structure, with the distal end directed anteriorly.

Adult female and nymph. Unknown.

Genus Euphyllura

Euphyllura arctostaphyli Schwarz

Specimens. One male (17157 Lot 58), June 26, 1925, one male (17157 Lot 64), August 1, 1925, one female (17157 Lot 67), August 4, 1925, and one female (17157 Lot 86), August 25, 1925, all taken from *Pinus ponderosa*, Midday Valley, Merritt, B. C., (Wm. Mathers).

Host: Arctostaphylos spp. (Manzanita). The nymphs are found on the ventral side of the leaves in cases of mild infestation. In more severe cases they are found on both sides of the leaves, on the petioles, smaller branches, buds, and inflorescence. In some instances, the nymphs are simply covered with cottony or flaky wax secretion, but in many cases the last stage nymphs are found in cells 2-3 mm. long, 1.5-2 mm.

broad, and 1 mm. deep made of the wax secretion. In such cases the preceding nymphal stages are apparently all passed in the same cell, since vacated cells with an opening at one end are frequently found with the skins of all but the last stage nymphs embedded in the material forming the wall of the cell.

EUPHYLLURA ARBUTI Schwarz

Specimens. One male and one female, from *Arbutus menziesii,* Gordon Hd., B. C., September 7, 1925, (W. Downes); one male and one female, from Honeysuckle, Galiano, B. C., June 27, 1928, (Oscar Whittaker).

Host: Arbutus menziesii (Madrone; Arbutus Tree). The nymphs occur in cells constructed from the waxy secretion. Typically these cells are found under the bark scales particularly of the smaller branches and twigs where they are more or less protected. In severe cases of infestation they are found on the leaves, petioles, and on unprotected twigs. Usually the wall of the cell and the excretory matter of the nymphs become heavily infested with jet black "sooty mold" which apparently still further obscures and protects the nymphs. The last stage nymphs are found on the smaller branches, on the petioles, or on the leaves entirely unprotected by waxen cells for a short time prior to the last molt.

GENUS PSYLLIA

PSYLLIA PARALLELA Crawford

Specimens. Two females, from unknown host, Chilcotin, B. C., September 1, 1920, (E. R. Buckell); two females, from unknown host, Nicola Lake, B. C., April 13, 1922, (E. R. Buckell); one male and one female, from unknown host, Chilliwack, B. C., February 15, 1923, (Oscar Whittaker); one female, from unknown host, Toppenish, Washington, March 5, 1926, (E. W. Davis).

Host and nymphs unknown.

PSYLLIA ASTIGMATA Crawford

Specimens. One male (2060, "3"), from unknown host, Thormanby Island, B. C., August 8, 1925, (Oscar Whittaker); one female (2082), from unknown host, Thormanby Island, B. C., August 8, 1925, (Oscar Whittaker); one male and three females, from Wild Cherry, Esquimalt, B. C., September 22, 1927, (W. Downes).

Host: Prunus emarginata (Bitter Cherry; Wild Cherry). The nymphs occur in excessive abundance on both sides of the leaves, on the petioles, and the smaller twigs in severe cases of infestation. In such cases they are very conspicuous because of the abundance of flossy threads of waxy secretion several millimeters long, formed by and carried about by the nymphs. As many as thirty-five to forty nymphs were observed on a single leaf in a heavily infested thicket of the host in the Sierra Nevada mountains south of Mono Lake, California, in the latter part of June. At that time adults were exceedingly scarce and the nymphs were apparently all of approximately the same stage.

PSYLLIA ALNI AMERICANA Crawford

Specimens. One female, from Cottonwood, Victoria, B. C., September 8, 1922, (W. Downes); one female, from unknown host, Victoria, B. C., August 14, 1922, (W. Downes); one female, from unknown host, Sooke, B. C., June 30, 1923, (W. Downes); one male, from unknown host, Thormanby Island, B. C., August 8, 1925, (Oscar Whittaker).

Host: Alnus rhombifolia (White Alder). The nymphs occur, sometimes in very great abundance, on the younger leaves and smaller branches in April and May and later in the spring at the higher altitudes. They are conspicuous because of their large amounts of dense white waxy secretion which may sometimes completely cover the leaves.

PSYLLIA CAUDATA Crawford

Specimen. One female, from unknown host, Vancouver, B. C., July 28, 1922, (W. Downes).

Host and nymphs unknown. Adults have been recorded from *Alnus tenuifolia* in Colorado.

A NEW SPECIES OF DOLICHOPODIDÆ FROM JAVA, IN THE COLLECTION OF THE CALIFORNIA ACADEMY OF SCIENCES

BY M. C. VAN DUZEE

Argyra javanensis, new species

Male. Length 7 mm. Face and front wholly opaque with white pollen, occiput green, white pollinose; face as wide as

third antennal joint; palpi and proboscis black, the former with black hairs; antennæ black, first joint with stiff, black hairs above and below at tip, third joint more than twice as long as width of base, its tip rounded; arista inserted above its tip, twice as long as third joint, their tips appearing white; posterior orbits with a few black cilia above, beard whitish.

Dorsum of thorax and scutellum dark green, ground color nearly concealed by the thick white pollen, except on posterior slope and on the scutellum, the latter with a few small black hairs on the disk and along the edge, the usual bristles seem to have been broken off. Abdomen black with large yellow spots on the sides at base of second, third and fourth segments, which occupy half or more of these segments; the whole abdomen covered with thick white pollen, so as to almost conceal the ground color when viewed at the right angle; venter with basal half of second, third and fourth segments yellow. Hypopygium small, nearly round, black with small black appendages.

All coxæ, trochanters, extreme base of all femora and tips of posterior ones black; femora, tibiæ and fore and middle tarsi yellow; tips of posterior tibiæ and whole of their tarsi black; middle tarsi with tips of joints brown; fore coxæ with black hair, which is longer and bristle-like at base and tip; fore femora with long black hair on lower and posterior surfaces; middle femora with long black hairs on lower anterior and posterior edges; posterior femora with a few long black hairs below; length of fore tibiæ as 114, joints of fore tarsi as 73-20-13-10-11; those of middle tarsi as 71-25-15-7-9; of posterior tarsi as 88-31-20-11-10. Calypters yellow with a black margin and pale yellow cilia; halteres yellow.

Wings grayish, slightly tinged with brown in front, especially from tip of first vein to tip of third; last section of fourth vein considerably bent just before its middle, parallel with third beyond this bend, but both bent backward towards their tips, fourth ending in apex of wing; last section of fifth vein one and three-fourths times as long as cross-vein. Described from one male, taken in Java.

This is the second species of Argyra described from Java, the other (*spinipes* Dolesch) has the antennæ "rufis."

THE SPHÆRIDIINÆ OF THE PACIFIC COAST

Coleoptera, Hydrophilidæ

BY R. E. BLACKWELDER
Stanford University, California

This paper is intended to include all the species of the subfamily Sphæridiinæ recorded from the Pacific Coast of North America from Alaska to Lower California. Its purpose is to enable persons who do not have access to Horn's revision [1] or who have not the time for a careful study of the group to determine their specimens as easily and accurately as possible. There are also several additions and corrections to Horn's work which have been published recently or which have been noticed during the preparation of this paper which are included here.

The synonymy of the group is not yet perfectly worked out, but the recent corrections by Fall [2] have definitely settled the status of several of our species. A careful study of the detailed description of *Cercyon californicus* Fall [3] convinces me that it is the same thing that was described in 1922 by Knisch [4] from "California." The descriptions agree in every detail and it is very likely that Fall had not seen Knisch's paper. A comparison of types would settle the matter, but I have not been able to find any type material of *C. kulzeri* in this country. The California Academy of Sciences has specimens from the type locality of *C. californicus* which are probably typical.

Considerable trouble has been experienced in the use of Horn's key to the species of *Cercyon*. Some of the characters there used are obscure, and a few are definitely incorrect. In some species the central elevated area of the metasternum is extended laterally and anteriorly by a raised line curving outwards toward the anterior angle on each side. The extent of this area is limited unless the line is definite and distinct and reaches at least nearly to the front angle. All the species of *Cercyon* have the prothorax laterally margined by an impressed line. In some species this line extends around the posterior angles and along the base. The presence or absence of this basal

1 Horn, G. H. Rev. of Sphæridiinæ of U. S., Trans. Am. Ent. Soc., XVII, 1890, pp. 280-312.
2 Fall, H. C. Notes on Cercyon, Psyche, XXXI, 1924, pp. 247-253.
3 Psyche, XXXI, 1924, pp. 251-252.
4 Knisch, Archiv. fur Naturg., LXXXVIII, 1922, A (5), pp. 97-100.

line is an important character and one over which Horn made several mistakes. *C. lateralis* does have the line extended slightly past the hind angles, but it is often obscure and visible only from directly behind the prothorax. In some species the marginal line is very clear, extending well along the base, but in others it is very short, barely passing the hind angles.

Very free use of Horn's revision has been made in preparing this paper. The key to genera is taken from that work and most of the descriptions are adapted and abridged from his descriptions. The key to *Cercyon* has been completely rewritten, as the older one was unsatisfactory.

Several of the species reported by Horn from this coast have not since been recorded. Some of these may be the result of errors; all are, however, included here. All new localities are represented in the collection of the California Academy of Sciences.

Mr. E. P. Van Duzee of the California Academy of Sciences in San Francisco has very kindly allowed me to use the specimens in the collection of that institution and Messrs. Chas. Liebeck and H. C. Fall have greatly aided me by loaning specimens of several species of *Cercyon*. Dr. E. C. Van Dyke of the University of California has been most generous with his time, material, library, and advice and has helped me to settle several of the more difficult points.

Subfamily Sphæridiinæ

Small, terrestrial Hydrophilidæ, living in various kinds of decomposing vegetable matter. Generally oval and more or less convex; brown or black with the elytra frequently tipped with yellow, and usually with ten striæ or rows of punctures. Antennæ 9-segmented, first segment of middle and posterior tarsi elongated.

Three hundred and forty-six species, belonging to fifty genera, have been described from all over the world. Of these genera ten are known from North America and five from the Pacific Coast.

Key to Pacific Coast Genera of Sphæridiinæ

1. Elytra extended below the lower surface of body, epipleuræ in great part vertical; metasternal side pieces wide. (Cyclonoti.) ..... *Dactylosternum*

Elytra not extended 2

2. Elytra not inflexed, epipleuræ horizontal, distinct; metasternal side pieces moderate in width, parallel; prosternum carinate at middle. (Cercyones.) 3

Elytra inflexed, clasping the sides of the body, without distinct epipleuræ; metasternal side pieces narrow, partly covered by the inflexed elytra; prosternum elevated at middle, forming an area. (Megasterni.) 4

3. Scutellum elongate; pygidium visible ..... *Sphæridium*
Scutellum equilateral; pygidium covered ..... *Cercyon*

4. Lateral margin of prothorax not inflexed ..... *Megasternum*

Lateral margin of prothorax angularly inflexed; anterior tibiæ entire ..... *Cryptopleurum*

Group Cyclonoti

Metasternum prolonged between the middle coxæ, closely united with the mesosternal elevation, the suture always distinct, and often impressed.

Genus Dactylosternum Wollaston

Prosternum strongly carinate, not notched behind to receive point of mesosternum. Metasternum prolonged in a process completely separating the middle legs, the episternum wide and suture straight; mesosternum elevated in front of the metasternal process, usually in the form of an arrow-head, the suture between the two sterna well marked. First ventral abdominal segment distinctly carinate at middle.

Dactylosternum cacti Lec.

Antennæ pale testaceous with brownish club. Head closely punctate, more finely in front. Thorax closely and equally, but not coarsely punctate. Elytra punctulate, a little more coarsely but less closely than the thorax, the striæ replaced by rows of punctures, these rather coarser and deeper at the sides, sutural stria distinctly impressed on its apical half. Body beneath piceous or brownish, opaque. Prosternum carinate, the carina elevated in front. Legs pale piceo-rufous. Length .20 to .24 inches (5 to 6 mm.).

This is the only species recorded from the Pacific Coast. It occurs in southern California and Arizona in decomposing cactus of the more massive forms (Cereus, etc.). Taken in Los Angeles County, by Dr. E. C. Van Dyke. Rather rare in southern California, more abundant in Arizona.

Group Cercyones

Metasternum not at all, or extremely little extended between the middle coxæ. Prosternum moderately wide in front of the coxæ and carinate at middle. First ventral segment distinctly carinate. Elytra with distinct lateral edge, the epipleuræ distinct and horizontal. Metasternal side pieces of moderate width, the sides parallel.

Two genera are known from this coast. They may be separated by means of the foregoing table.

Genus Sphæridium Fabr.

Fifteen species of Sphæridium are known. The genus occurs in almost every part of the world. Only two are found in North America, and one in our territory.

Sphæridium scarabæoides L.

Oval or subglobose, convex. Above black, shining; elytra with a reddish subbasal spot and the apical fourth yellowish; beneath piceous, the femora spotted with paler. Thorax and elytra finely and evenly punctured, the latter without striæ. Length, 5.5 to 6.5 mm.

Occurs throughout the United States and much of Canada. A cosmopolitan species. Recorded first from North America about 1880, from the Northwest about 1913, and from California in 1920 (Van Dyke).

Genus Cercyon Leach

Prosternum scarcely separating the anterior coxæ, the median line carinate in a variable degree. Mesosternum elevated between and in front of the middle coxæ, the suture between the meso- and metasterna being always well marked. Tibiæ spinulose on their outer edge, the front tibiæ entire on the outer edge. Metasternum does not project between the middle coxæ.

This genus is world-wide in distribution. One hundred and twenty-one species are recorded, of which probably more than twenty-five are from North America and sixteen from the Pacific Coast. They are found in dung and other decomposing matter.

Key to Pacific Coast Species of Cercyon

1. Elytral striæ deeply impressed from base to apex, intervals slightly convex ..... *fimbriatus* Mann.
   Elytral striæ not deep; intervals flat 2
2. Metasternal area extended by an oblique line directed toward the anterior angle 3
   Metasternal area limited to middle of metasternum 6

3. Lateral marginal line of prothorax extended, at least slightly, along the base ..... *nigriceps* (Marsh.)
   Lateral marginal line not distinctly extended along base 4
4. Undersurface shining, not opaque; mesosternal elevation longitudinally sulcate; striæ replaced by rows of punctures ..... *navicularis* Zimm.
   Undersurface opaque; mesosternal elevation flat; striæ impressed 5
5. Elytral intervals densely punctulate, at least on disk; epipleurae pale ..... *hæmorrhoidalis* (Fabr.)
   Elytral intervals indistinctly punctate; elytra reddish, with a large scutellar triangle and humeral stripe piceous ..... *pygmæus* (Ill.)
6. Elytral striæ replaced by rows of punctures; body very convex 7
   Elytral striæ impressed, at least in part of their length 8
7. Upper surface entirely rufescent ..... *rufescens* Horn
   Color darker; thorax piceous, sometimes with an indistinct pale margin ..... *tristis* (Ill.)
8. Mesosternal elevation linear or narrowly lanceolate 9
   Mesosternal elevation oval, only twice as long as wide; upper surface alutaceous ..... *kulzeri* Knisch
9. Elytral striæ evenly impressed, or more deeply at base 10
   Elytral striæ decidedly more deeply impressed toward the apex 11
10. Elytral intervals not very distinctly punctulate; prothorax usually with prescutellar impression and distinct impressions opposite the base of the fourth striæ ..... *lunigerum* Mann.
    Elytral intervals distinctly punctate, not alutaceous; antebasal impressions indistinct ..... *marinus* Thoms.
11. Lateral marginal line of prothorax extended at least slightly along the basal margin 12
    Lateral marginal line reaching the hind angles only. (Variable in *adumbratus*, but never very distinctly extended beyond the angles) 13
12. Length, 2 to 3 mm.; elytra reddish brown with tip indefinitely paler ..... *lateralis* (Marsh.)
    Length, 1.5 to 2 mm.; elytra yellowish ..... *quisquilius* (L.)
13. Prothorax very little longer at middle than at sides; legs piceous; prothorax very faintly paler at sides ..... *depressus* Steph.
    Prothorax decidedly longer at middle than at sides; legs rufotestaceous; sides of prothorax usually indefinitely but decidedly paler 14
14. Elytra alutaceous; less than 2 mm. long ..... *opacellus* Fall
    Surface shining; 2 mm. or more in length 16
15. Elytral intervals closely punctate on the disk ..... *fulvipennis* Mann.
    Elytral intervals not distinctly punctate ..... *adumbratus* Mann.

Cercyon depressus Steph.

Oval, piceous; elytra testaceous. Head punctate, rather closely at the sides and apex, smoother at middle. Prothorax punctate, but not closely; base of prothorax usually with a prescutellar impression. Elytra striate, tenth stria entirely lacking, striæ deeper toward apex, finely punctate. Legs rufo-piceous. Length 2 to 2.5 mm.

Recorded by Horn from California.

Cercyon fimbriatus Mannerheim

Oval, moderately convex, color variable. Antennæ testaceous, club brownish; palpi piceo-testaceous; body beneath dark brown or black, opaque; legs variable in color. Head always piceous, shining, moderately closely punctate; base of prothorax without marginal line, surface finely and closely punctate at middle, more coarsely and less closely at the sides. Elytra deeply striate, striæ not punctate, tenth stria scarcely evident, intervals moderately convex, finely and closely punctate on the disk, alutaceous at sides and apex without distinct punctures. Length 2.5 to 3 mm.

This species is very variable in color, but is readily distinguished from all others by the heavily impressed striæ and convex intervals. It occurs abundantly under decomposing seaweed on the coast from Alaska to San Diego.

Cercyon lungerum Mannerheim

Piceous, moderately shining, thorax with a small pale spot near the front angle, elytra reddish yellow, with a narrow crescentic transverse space divided by the suture; body beneath opaque, black; legs piceous. Head sparsely indistinctly punctate; surface of prothorax moderately closely punctate, a little more coarsely near the sides. Elytra finely striate, the striæ finely punctate, intervals flat, not very distinctly punctate on the disk, alutaceous at apex and sides with the punctures indistinct. Mesosternal carina long and linear. Length 4 mm.

This is the largest of our species. It is found with the preceding under decomposing seaweed, but distinguished at once by the flat intervals and larger size. Found along the coast from Alaska to Catalina Island.

Cercyon quisquilius Linnaeus

Oval, piceous, shining, sides of thorax pale, elytra testaceous, sometimes slightly clouded on disk near base; body beneath opaque; legs reddish. Head moderately closely, but not coarsely punctate. Basal marginal line of prothorax distinct at outer third, base with a distinct impression opposite the scutellum, surface moderately closely punctate, less closely at the sides. Elytra ten-striate, striæ rather closely punctate, those of the disk indistinct near base, deeper

near apex, intervals flat, moderately closely punctate on the disk, but much more sparsely at sides and apex. Mesosternal elevation linear. Length 1.5 to 2 mm.

Found in manure from Washington southward into central California. It is also found in Europe, Siberia, and Japan.

Cercyon marinus Thomson

Piceous, shining; sides of prothorax bordered with pale, elytra with yellowish testaceous space, well defined, extending along the side very nearly to the humeral angles; epipleuræ piceo-rufous; body beneath opaque black; legs piceo-rufous, the femora darker. Head moderately punctate; prothorax without lateral marginal line, disk more coarsely and closely punctured than the head. Elytra ten-striate, striæ punctate, and indistinct at apex; intervals flat, closely punctate, more sparsely near apex and coarser at sides; mesosternal elevation very narrowly lanceolate. Length 2.5 to 3 mm.

Taken in Lassen County, California, by J. O. Martin.

Cercyon fulvipennis Mannerheim

Oval, piceous black, shining, sides of thorax pale, elytra brownish or piceo-testaceous, sides and apex somewhat paler; body beneath black, opaque; legs rufous. Head rather coarsely and moderately closely punctate. Thorax punctured similarly to the head, basal marginal line wanting. Elytra ten-striate, the tenth stria represented by a row of punctures, striæ moderately deeply impressed, rather more so at sides and apex, rather closely punctate, and more coarsely at the sides, intervals flat, closely punctate on the disk. Length 2.5 to 3 mm.

Differs from *lateralis* in the absence of the basal marginal line of prothorax. Common in excrementitious matter from Alaska southward to central California.

Cercyon lateralis Marsham

Oval, piceous black, shining, sides of thorax pale, elytra reddish brown, apex somewhat paler; body beneath black opaque; legs rufo-testaceous. Head moderately punctate; base of prothorax without definite prescutellar impression, lateral marginal line extending slightly past anterior angles and along the base, surface moderately, not closely punctate, although a little variable. Elytra striate, striæ closely punctate, deeper near the apex, intervals flat, more convex at apex, closely punctate, but more sparsely near the apex, tenth stria not impressed, replaced by a row of punctures. Length 2.5 to 3 mm.

This species bears a very close resemblance to *fulvipennis*, but differs from it in the presence of the basal marginal line of prothorax. Horn was in error when he said that *lateralis* did not have the lateral marginal line extended. Occurs in Alaska

(Horn) and in California from San Diego northward, both coastal and inland.

CERCYON ADUMBRATUS Mannerheim

Oval, shining, variable in color from piceo-testaceous to piceous, but with the sides of thorax and elytral apex indefinitely paler; body beneath piceous, opaque; legs rufo-testaceous. Head moderately coarsely, not closely punctate; disk of prothorax moderately punctate, punctures finer in front and almost obsolete at the sides. Elytra striate, the tenth stria obsolete, striæ deeper at sides and apex, those of the disk scarcely visibly punctate, those at sides distinctly so, intervals of the disk not distinctly punctate. Mesosternal elevation very narrow, but with a distinctly punctate edge. Length 2 to 2.5 mm.

This species varies in color greatly, resembling *fulvipennis*, *lateralis*, and *hæmorrhoidalis*, but differs from all in the almost entire absence of interstrial punctation. Taken by Van Dyke from under dead grass at edge of beach along Alaskan coast. It occurs from Alaska southward to Vancouver and Washington.

CERCYON HÆMORRHOIDALIS Fabricius

Oval, piceous; elytra piceo-castaneous, brownish or somewhat paler, the apex usually paler than the disk; epipleuræ pale; body beneath black, opaque; legs piceo-rufous, femora darker. Head rather coarsely and closely punctate. Prothorax entirely piceous, surface closely punctate. Elytra ten-striate, the tenth stria replaced by a row of punctures, striæ distinct at apex, moderately closely punctate, intervals flat, densely punctulate, more sparsely at the sides and apex. Metasternal area extended by a line directed toward the outer front angles. Mesosternal elevation elongate-lanceolate, not sulcate, punctate. Length 2.5 to 3 mm.

This species varies in the color of the elytra from piceous to castaneous, but has usually a narrow dark border along the base, which extends along the suture nearly to apex. Taken at Paraiso Springs and Carmel (Slevin), California.

CERCYON PYGMÆUS Illiger

Oval, piceous black, elytra piceo-rufous, or paler, with a large triangular basal space of variable extent and a humeral stripe piceous; prothorax entirely piceous; epipleuræ pale; body beneath piceous, opaque; legs pale rufo-testaceous. Head distinctly, not closely punctate; usually a distinct prescutellar impression at base of prothorax, surface moderately closely, but not deeply punctate. Elytra striate, the tenth very indistinct, striæ punctate and deeper at base, intervals flat, sparsely indistinctly punctate, much more finely than the thorax. Metasternal area continued by a well ele-

vated line to the anterior angles. Mesosternal elevation very narrow, but punctate. Length 1.5 to 2 mm.

This species varies in the extent of the piceous triangle of the elytra, which may cover fully half the entire area or may be reduced to a small spot at the scutellum. Resembles *melanocephalus* but is always smaller. The punctation of the head is much less distinct than that of the thorax. Taken in Oregon and southern California by Blaisdell and Slevin.

Cercyon nigriceps Marsham

Oval, piceous, shining, sides of thorax indefinitely paler; elytra reddish testaceous, with a common fuscous spot behind the middle; epipleuræ pale; body beneath, opaque black; legs rufo-testaceous. Head distinctly, not closely punctate. Basal marginal line of prothorax distinct at the side. Elytra moderately deeply striate, the tenth stria obliterated, striæ relatively coarsely punctate, the intervals slightly convex, scarcely distinctly punctate. Metasternal area prolonged by an elevated line to the anterior angles. Mesosternal elevation linear, smooth. Length 1.5 to 2 mm.

In many specimens the metasternal area is pale. Our smallest species. Rare. Taken at San Diego (Blaisdell) and Pomona, California.

Cercyon opacellus Fall

Oval, narrower behind, piceous black, subopaque; elytra finely alutaceous, at apex with a well defined pale space extending along the side margin; thorax piceous, near the side margin indistinctly paler; body beneath opaque black; legs rufo-testaceous. Head moderately finely, closely punctate. Surface of prothorax more distinctly impressed at sides and apex, the tenth stria wanting, striæ finely punctate on the disk, more coarsely and closely at sides, intervals flat, alutaceous, not distinctly punctate. Mesosternal elevation very narrowly oval, punctate. Length 1.5 mm.

Recorded by Horn, as *lugubris*, from California and Nevada.

Cercyon tristis Illiger

Oval, very convex, distinctly narrower behind, black, subopaque, alutaceous; elytra with an apical pale space; prothorax piceous, shining, sometimes with a slight pale space at anterior angle; body beneath opaque black, legs rufo-testaceous. Head shining, distinctly and moderately closely punctate. Surface of prothorax relatively coarsely punctate, a little closer at middle than at the sides. Elytra distinctly alutaceous and subopaque, the striæ replaced by rows of fine punctures not closely placed, which are almost entirely obliterated at the sides and apex, intervals flat, obsoletely punctate near the base only. Mesosternal elevation lanceolate. Length 1.5 mm.

Recorded by Horn from California, Washington and Nevada.

Cercyon kulzeri Knisch

Oval, elongate, piceous, tip and posterior margins of elytra and anterior angles of prothorax yellow; entire dorsal surface shining though entirely alutaceous; legs pitch brown or reddish, tibiæ and tarsi red or yellowish red. Head very finely and sparsely punctured. Punctation of prothorax similar to head; elytra with ten moderately fine striæ, tenth fainter; punctures of striæ coarser at sides, less distinct at apex. Intervals more strongly punctate than thorax. Mesosternal elevation about twice as long as wide, rounded at the ends, distinctly and moderately closely punctate. Length 1.5 to 1.8 mm.

This species is characterized by the alutaceous upper surface; by the elytral intervals being finely but more strongly and distinctly punctured than the thorax; and by the wide surface of the mesosternal elevation. Recorded by Knisch from California. Taken from Lassen County to San Diego, California (Blaisdell, Martin, Van Dyke, Fall).

Cercyon rufescens Horn

Oval, convex, rufescent, moderately shining. Head and thorax sparsely finely punctate. Elytra without impressed striæ but with rows of punctures not closely placed, the eighth, ninth, and tenth rows with the punctures deeper and closer for part of their length; intervals flat, equal in width, irregularly biseriately punctate, more distinctly than prothorax. Metasternal area not well defined. Mesosternum oval, acute in front, coarsely punctured. Length 2 mm.

Close to *tristis* and *kulzeri*, but distinguished by its completely pale color. Described by Horn from Sierra San Lazaro, Lower California.

Cercyon navicularis Zimmermann

Oval, narrower posteriorly, piceous black, shining; elytra slightly rufescent at tip and along the suture posteriorly; body beneath piceous, shining, sparsely punctate; legs rufo-testaceous. Head sparsely, finely and indistinctly punctate. Prothorax almost absolutely smooth, a few sparse and fine punctures near the sides. Elytra very convex, rapidly declivous posteriorly, the sutural region slightly elevated on the declivity; surface with striæ of very fine punctures, which are, however, more distinct at side and apex, the interstrial spaces very sparsely punctate. Metasternal area with a fine but distinct oblique line. Mesosternal elevation lanceolate, longitudinally sulcate; metasternum in front truncate. Length 1.5 mm. or a little longer.

The presence of the oblique metasternal line and the shining underside will readily distinguish this species from any other Cercyon. Recorded by Horn from California.

Group Megasterni

The side pieces of the metasternum are partly covered by the elytra so as to be much narrowed. The middle coxæ are widely, almost entirely, separated by a large pentagonal mesosternal area. Metasternum not or very little prolonged between the coxæ and very closely united with the mesosternum, the suture scarcely visible. Prosternum at middle elevated to the plane of the mesosternum forming an area. First ventral segment carinate.

Two genera occur on this coast and are separated by the characters given in the foregoing table.

Genus Megasternum Mulsant

Maxillary palpi with last segment distinctly longer than the penultimate. Prosternum elevated, forming a somewhat hexagonal area, which rather widely separates the anterior coxæ, meeting the mesosternum and having a notch in its posterior margin. Middle coxæ widely separated by a process formed partly of the metasternum and partly of the mesosternum, the latter being in the form of a broadly pentagonal plate, acute in front, the union between these two sterna being very close, although with a distinct suture. Anterior tibiæ deeply notched on the outer edge near the apex.

Only one species has been recorded from this coast, though six are known and two occur in the United States. The genus occurs also in Europe, Asia, Japan, and Alaska.

Megasternum posticatum Mannerheim

Oval, slightly narrower behind, convex, piceous, sides of prothorax and humeral spot indefinitely paler; elytra at apex distinctly paler; body beneath piceous, slightly shining; legs rufo-piceous. Head smooth, shining, entirely piceous. Basal marginal line of prothorax absent, surface smooth, shining, a few sparsely placed, very fine punctures near the side. Elytra finely alutaceous, surface finely striate, striæ deeper near the apex, the punctures of the striæ deeper near the apex, intervals flat, not punctate. Length 2 mm.

Genus Cryptopleurum Mulsant

Fourteen species of Cryptopleurum are known from the Pacific area and Europe, four of them occur in the United States, but only one species has been reported from our Pacific Coast.

Cryptopleurum unicolor Motschulsky

Oval, convex, punctulate, rufous; palpi long; thorax transverse, narrowed in front, laterally arcuate; elytra striate, the striæ punctate; tibiæ spinose on exterior edge. Length, 2 mm.; width, 1.4 mm.

Taken at Sitka, Alaska.

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FURTHER NOTES ON THE GENUS *RHAGOVELIA*

Hemiptera, Veliidæ

BY C. J. DRAKE AND HALBERT M. HARRIS

Since the publication of "Notes on the Genus *Rhagovelia*, with Descriptions of Six New Species" in Proc. Biol. Soc. Wash., Vol. 40, 1927, pp. 131-138, the writers have received for study numerous specimens of American water-striders. This paper deals with the genus *Rhagovelia* and contains the description of one new species with new data on the distribution of several other species.

Rhagovelia reposita, Drake and Harris, sp. nov.

Blackish brown, somewhat paler beneath, clothed on legs, sides of body, and genital segments with long, brown hairs. A large triangular patch at the base of each hemelytron and a smaller oval spot on the membrane, silvery whitish; sides of pronotum in front broadly silvery, this becoming more or less flavous toward the median line above. Pronotum strongly swollen between the humeri, coarsely pitted, with a very distinct median carina; the humeri prominent, somewhat tubercular, and each terminating in a large blunt spine; the base triangular, its margin somewhat pale, carinate, and ending in a produced, acute point. Head produced in front of eyes and sloping obliquely downward, with distinct impressed median line, the vertex also with two short, oblique, impressed lines on each side above. Antennæ long, dark brown, finely pilose, the basal segment with a few scattered setæ; segment I distinctly curved, stoutest, III and IV slenderer and slightly paler than the others, IV faintly curved; proportion of segments, I:II:III:IV=50: 44:33:26.

Rostrum testaceous, the apex black, not quite reaching middle of mesosternum. Prosternum and mesosternum with a broad longitudinal sulcus; metasternum strongly tumid, its hind margin broadly angular. Venter prominently carinate. Connexivum somewhat flavous, strongly produced into a long pointed process at the apex. Legs brown, the coxæ and trochanters flavous. Hemelytra blackish, the silvery markings at the base forming an interrupted transverse band, the veins darker. Length, 9.1 to 9.8 mm.; width, 2.8 to 3 mm.

Apterous form: Pronotum less tumid, rounded behind, the median carina terminating behind in a strongly produced point. Abdomen somewhat silvery pubescent on each side at the base above, clothed with short, very fine hairs.

Male: Venter carinate throughout, the last segment with a broad sulcus on each side of the carina, the latter very high and thicker along the basal third and there produced into a backward projecting tubercule; the apical margin forming a distinctly raised U-shaped, plate-like structure into which the raised area of the first genital

segment fits. First genital segment cylindrical, strongly curved downward posteriorly, longitudinally furrowed behind, the distal margin terminating at the middle in a broad triangular projection, the raised ridge on each side of the sulcus (a little in front of hind margin) produced into an oblique, broad, flat, black-margined, spine-like projection. Terminal segment with an elevated, three-pointed process above. Clasper long, forming a stout hook with a prominent, flattened spine-like projection near the base of the stem. Legs long; the posterior femora very strongly incrassate, thickest before the middle and armed within with several irregular rows of stout, variable sized, blunt, black spines; hind tibiæ also with prominent, shorter spines; hind trochanters finely dentate.

Female: Venter with the carina becoming obsolete posteriorly, the last segment slightly more than a half longer than the preceding one, its hind margin slightly produced in the middle. Last abdominal segment above produced on each side into a prominent, hairy, finger-like process. Posterior femora slightly swollen, armed within with a row of black spines, two or three of which, on the distal half, are very long.

Holotype, winged male, *allotype*, winged female, *morphotype*, wingless male, and *paratypes*, many males and females, Chiquimula, Guatemala, 1930, in author's collection. This species may be separated from any known species by its size and the characters of the pronotum, venter, and genitalia. It should be noted that there is a slight variation in the size of the humeral spines of the pronotum.

Rhagovelia armata Burmeister

Chiquimula, Guatemala. Four specimens,—one macropterous male, two apterous males, and one apterous female.

Rhagovelia collaris Burmeister

Numerous specimens, Chiquimula, Guatemala, and one winged male, Horse Ranch Canyon, Arizona, J. A. Kartchner, collector. In the male the hind legs show a considerable amount of variability in the degree of incrassateness of the femora and a corresponding variation in the shape of the tibiæ. In those specimens with the less incrassate femora the tibiæ are nearly straight. The pronotum is clothed with short, fine, golden pubescence.

Rhagovelia whitei Breddin

Many specimens, Chapada, Brazil, H. E. Summers' collection, Iowa State College.

Rhagovelia excellentis Drake and Harris

In addition to the type series specimens are at hand from Boulder and Ft. Collins, Colorado, E. R. Becker and from Las Cruces, New Mexico, C. D. Lebert.

Rhagovelia spinigera Champion

Many winged and wingless males and females are at hand from Balsas and Cuernavaca, Mexico; San Jose, Costa Rica; and Chiquimula, Guatemala.

Rhagovelia hirtipes Drake and Harris

Macropterous female: Antennal proportion, 22:13:14:14. Mesosternum with a raised, inverted V-shaped ridge which is clothed with long fine hairs. Apex of abdomen beset with long hairs.

Macropterous male (allotype): Antennæ as in female. Pronotum with a rather distinct median carina, the apex narrowly rounded and clothed with long hairs. Hind femora short, moderately to strongly incrassate, densely clothed with long hairs, armed within before the middle with a long yellowish-brown spine which is followed by several smaller, black-tipped spines. Hind tibiæ straight, closely dentate within. Last ventral segment a little longer than the preceding one, very strongly impressed behind, the margins of the impression densely hairy. First genital segment strongly curved downward posteriorly. Clasper short, broadest near the base, narrowed and abruptly bent beyond the middle to form a distinct hook.

Apterous form: Pronotum without carina, the posterior margin broadly rounded. Male narrowed posteriorly, the legs more strongly incrassate. Female with a rather prominent tuft of hairs on the first abdominal segment above.

Numerous specimens from Chiquimula, Guatemala. Heretofore known only from the holotype, a macropterous female, from San Pedro, Honduras. The pronotum is provided with a few fine, inconspicuous deep punctures.

Rhagovelia elegans Uhler

Several specimens, Grenada, West Indies, H. E. Summers, collector. These specimens represent type material.

Rhagovelia angustipes Uhler

Numerous examples, Grenada, British West Indies.

Rhagovelia plumbea Uhler

Grenada, West Indies, and a very fine series from Honduras.

The Negro Scale in California

The negro scale, *Saissetia nigra* (Nietner), has often been taken in quarantine in California, on plant materials grown in greenhouses or introduced from tropical and subtropical regions. It has also been observed occasionally in greenhouses and lathhouses in the state. In 1920 G. F. Ferris recorded its presence on *Euonymus* on the Stanford University Campus. In August, 1931, Ferris called the writer's attention to a pittosporum tree on the Stanford Campus which was rather severely infested with this insect. The tree was growing close to a building and may have been in just the right sort of a protected location for the propagation of the insect. Later in September, A. T. McClay, State Department of Agriculture, collected it on aralia in a nursery in San Rafael, Marin County, where it was apparently also doing nicely in the open. The past few winters have been rather mild in California and may be responsible for the present showing of the coccid. It is interesting to note, however, that whereas it has been considered impossible for the scale to live out-of-doors in Califorina, that it has apparently been quite able to sustain itself and even increase under certain conditions and may yet prove to be of economic importance in the future. One of its close relatives, the hemispherical scale, *Saissetia hemisphærica* (Targ.), is primarily a greenhouse pest in California and although it is frequently taken, often abundantly, on plants growing out-of-doors, yet in destructiveness it cannot be compared with its other close relative, the black scale, *S. oleæ* (Bern.), which has become the most important injurious insect in the state. Which one of these relatives the negro scale will follow can only be conjectured, but from all the evidence at hand it should be more like the hemispherical scale than like the black scale.—E. O. Essig.

A NEW SPECIES OF MOLORCHUS FROM CALIFORNIA

Coleoptera, Cerambycidæ

BY E. GORTON LINSLEY
Oakland, California

Molorchus eburneus Linsley, new species

Rufo-testaceous; head, metasternum, and apex of wings piceous, sparsely clothed with long erect hairs. Head moderately finely, sparsely punctate; front large, oblique; vertex medianly sulcate; eyes finely granulate, emarginate; antennæ slender, barely shorter than the body (♀), scape stout, second segment slightly longer than wide, third segment about three and one-half times as long as second, fourth, fifth, and sixth segments slightly shorter than third, subequal, remaining segments diminishing in length toward apex. Prothorax slightly longer than broad, gradually constricted behind, sides obtusely angulate; sparsely clothed with long erect hair, longer and more conspicuous in discal area; surface finely and simply punctured with the exception of a small polished callus in center of disk, a long dorso-lateral lunate callus, and a small round, shining lateral tubercle. Scutellum white. Elytra longer than broad, extending over basal half of first abdominal segment, about one and one-half times as long as prothorax, dehiscent; humeral angles prominent, acute; obliquely impressed from humeri to sutural margin, with a narrow ivory-white carina just posterior to and along latter half of oblique impression, also a short transverse impression before apices; puncturation fine, sparse, more deeply pronounced in basal region and along oblique impression; apices rounded, bullate. Abdomen shining, the segments diminishing in length and size toward apex, minutely and sparsely punctured, glabrous except at sides of basal segments, where clothed with a dense, fine, white pubescence. Legs slender; femora distinctly clavate, basal portion tubular, hind pair darker, almost piceous, with basal portion almost twice as long as clavate portion; tibia arcuate. Length, 10.5 mm.; breadth, 2.5 mm.

Type, female, (No. 1890, Mus. Calif. Acad. Sci.) taken at Glacier Point, Yosemite National Park, Calif., Alt. 7000 feet, on July 19, 1931, by Mr. A. Michelbacher, and one paratype in the collection of the author, taken at Fallen Leaf Lake, Calif., Alt. 6300 feet, on July 21, 1930, by Mr. A. T. McClay. Both specimens were taken on fir, *Abies*.

This species shows a much closer relationship with the European *M. minor* Linn., than with any of the previously described American species. This relationship is emphasized by the large prothoracic calluses and the ivory-white elytral

carinæ. It differs markedly from *M. minor*, however, in the shape and proportions of the prothorax and in sculpture and puncturation. In *M. minor* the prothorax is longer and narrower, more angulate at the sides, suddenly constricted behind, gradually anteriorly. The prothoracic calluses are very narrow and subparallel, whereas in *eburneus* they are wider, the edges less well defined, and distinctly arcuate. From the North American species, *M. bimaculatus* and *M. longicollis*, the larger size, greater robustness, color, and the structural characters of the prothorax and elytra easily separate *eburneus*. In addition, the puncturation of the head and prothorax in *bimaculatus* and *longicollis*, as in *minor*, is coarse, dense, and more or less variolate; in *eburneus* the puncturation is finer, sparser and simple.

All three of the American species of *Molorchus* are found in California. *M. longicollis* is a fairly common western species, ranging throughout the Pacific States and British Columbia, and may be taken on a great variety of shrubs and trees, usually on hardwoods, less commonly on conifers. *M. bimaculatus* replaces *longicollis* in eastern North America, likewise having a great number of host plants, but is also found in California, and the writer has taken typical specimens from the branches of Azalea, *Rhododendron occidentale* Gray, in Yosemite Valley, July 6-14. The following table will help to separate our species:

Key to the North American Species of Molorchus

1. Large, robust, light-colored species; prothorax gradually narrowed behind, distinctly angulate at sides, puncturation simple, fine, with a large dorso-lateral callosity; elytra with oblique ivory carinæ. 8.5 to 10.5 mm. Central California ..... *eburneus* n. sp.

   Small, slender, black species; prothorax rather suddenly constricted behind, rounded or only slightly angulate at sides, puncturation coarse, more or less variolate, lunate callosities lacking 2

2. Prothorax distinctly longer than broad; elytra testaceous, unicolorous. 5 to 7.5 mm. Pacific Coast ..... *longicollis* Lec.

   Prothorax only slightly longer than broad; elytra bicolored, base, apex and lateral margin black. 5 to 7 mm. North America ..... *bimaculatus* Say

THE BUTTERFLY BOOK. By W. J. Holland, 4to, pp. xii, 424, 77 plates. Doubleday, Doran & Co., Garden City, N. Y., Publishers. Price, $10.

"The Butterfiy Book," by Dr. W. J. Holland, has for thirty years been the standard book on the butterflies of boreal North America, over 60,000 copies having been sold. The new edition is an attempt to completely cover the fauna from the Arctic Circle to the Gulf of Mexico. The old edition figured 513 species and varieties on 48 plates. The new edition figures 972 species and varieties on 77 plates. The old edition had 184, the new 200 text-figures. The book, while but a little thicker than the first edition owing to the increased size of the letter-press, contains fully three-fourths more material than the first edition.

The most important feature of the new edition is the fact that many of the figures on the plates are representations of "types" or "paratypes," thus giving to the volume a definite scientific value, making it indispensable to scientific workers, while not detracting from its popular appeal to all who are interested in the study of the butterflies of the United States and Canada.

The book is characterized by conciseness and "Holland accuracy" in statement as well as in delineation. The author has endeavored to harmonize the results of the many later views as to nomenclature and has retained many names removed by recent authors who, following certain authorities, such as Hubner's "Tentamen," or erecting new names upon circumstantial technicalities, have overthrown the nomenclature in vogue for a century or more. This effort to restore after a fashion, or to stabilize the nomenclature, will be looked upon with pleasure, especially by certain American and older European writers.

In writing this book, Dr. Holland, who is regarded as "The Dean of American Lepidopterists," has done for the rising generation what he did for its predecessor. The appearance of this volume is the most notable event of the year for American students of insect life.—J. D. Gunder.

Editorial Note on Dr. Holland's Butterfly Book

The review notice by Mr. Gunder, preceding this, calls attention to the new edition of Dr. Holland's "Butterfly Book."

The students and collectors of our North American diurnals now have a very complete manual, comparable to the best published on the European fauna, by which they should be able to determine any butterfly found north of the Mexican boundary. As in the first edition of this work the species are not fully described, characters being mentioned only when necessary to supplement the figures, but notes on distribution, relationships and life history, in Dr. Holland's inimitable style, make the study of these beautiful insects a joy, and will hold the interest of anyone who may use this work. The teaching of nature study, or its equivalent, in our schools has greatly increased the number of those interested in insects, and among these the butterflies come in for more than their share. To all these students Dr. Holland's book will be an all-sufficient source of information by which they can determine and arrange their collections. Some of us who are now classed among the older entomologists cannot but contrast the ease with which beginners can now determine their material with the difficulties we used to encounter in the study of even our more common species. We had no Holland's "Butterfly Book" then.

Dr. Holland does not attempt to figure, or even to list, all the aberrations of our butterflies that have been given names. Many of these named aberrations represent extremes of melanism or albinism that can be found in most long series, and usually are connected by intermediates with the more typical form of the species. Many subtropical species are included which invade our southern borders, especially in southern Florida and about Brownsville, Texas. Farther west along the Mexican border we find the southern forms are mostly Sonoran, a fauna native to those areas, as it is to Sonora and Lower California north of La Paz, and one that finds its center of distribution close to, if not on, the international boundary.

Finally the publication of this new edition of the "Butterfly Book" places every student of our diurnals under renewed obligation to Dr. Holland, an obligation it is an honor as it is a pleasure to acknowledge.—E. P. Van Duzee.

STUDIES IN THE TENEBRIONIDÆ NUMBER THREE

(Coleoptera)

BY FRANK E. BLAISDELL, SR.

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The species of *Nyctoporis* defined below has been waiting for publication for more than a decade under a manuscript name. It is related to *carinata* Lec. The sculpturing of the head, pronotum, and elytra has been described in detail to form a basis of comparison for a synoptic revision of the tribe Nyctoporini in the near future.

Nyctoporus vandykei Blaisdell, n. sp.

Form elongate, comparatively slender, noticeably narrowed anteriorly and about three times as long as wide. Punctation foveate in character. Color deep black and moderately opaque. Apices of the tibiæ within and the tarsi beneath clothed with a silky ferruginous pubescence.

Head carinate, little wider than long, widest across anterior canthi, the latter more prominent than the eyes and tempora which are parallel on the same line; the tempora very slightly and gradually arcuate posteriorly; sides before the eyes very moderately convergent anteriorly, slightly arcuate and undulate, feebly notched at the oblique suture. Epistomal apex truncate between the moderately prominent and obtuse angles. Labrum transverse, apex quite arcuate, very feebly subemarginate in middle third. Frons extremely coarsely and densely punctate in the central area, punctures concave, much smaller laterally and anteriorly, especially on the epistoma; surface plane, irregular, median carina sublinear and weak, arising gradually from the vertex and extending to near the epistomal base where it is atrophic; supra-orbital carina over the eyes continued forward to the lateral margin on the supra-antennal convexity as a very irregular ridge, lateral to which and against the eye the surface is rather strongly impressed. Eyes not in the least prominent, short, transverse, about one and a half times wider than long, small as viewed from above, arcuately embracing the anterior canthi; facets rather coarse and extremely feebly convex. Mentum transverse, apex truncate; sides angulate, very obliquely straight and converging both apically and basally from the angle; surface impressed at base before the submental suture. Antennæ little longer than the pronotum and a little less than the width, moderately stout, not incrassate; second joint short and annular, third obconical and elongate, a little longer than the fourth, the latter slightly longer than wide; fifth to the eighth inclusive subequal in size and as wide as long, ninth and tenth very feebly triangular, slightly flattened on their

lateral surfaces, just the least longer than wide, eleventh smaller, irregularly rounded, apex feebly oblique.

Pronotum subquadrate, about one-sixth wider than long, apex slightly arcuate, broadly but not strongly sinuate laterally within the angles, the latter briefly prominent and obtusely rounded; sides very moderately arcuate anteriorly, becoming less so posteriorly and almost straight and sinuate for a short distance before the basal angles, the latter subacutely prominent; base a little wider than apex, broadly arcuate and sinuate within the angles; lateral and basal margins slightly reflexed; disk densely, extremely coarsely punctate, punctures concave and foveiform, intervals raised and more or less interrupted, forming irregular ridges; surface impressed laterally at middle against the margin, impression rather broad, rounded and very shallow; just within is a second or discal which is small and extremely feebly indicated; lateral surface is also narrowly impressed along the submarginal area and within the basal angles.

Elytra elongate, oval, about twice as long as wide, almost three times as long as the pronotum; base feebly emarginate, very slightly wider than the pronotal base; humeri small and rather sharply obtusangular; scutellum small, transverse and marginal; sides broadly and very moderately arcuate, becoming more strongly so at apex, where the small individual sutural angles are acutely prominent, and divaricate; disk slightly flattened in the central area, otherwise quite evenly arcuate from side to side, upper part of the apical declivity quite abruptly and arcuately declivous, thence oblique and straight on the apical lobe to apex; ten-striate, striæ of moderate sized, round and shallow punctures, those of each series separated one from another by an interposed small and round tubercle about equal to the diameter of a puncture; each puncture with a small curved seta at center. There are ten intervals, not including the submarginal on each elytron: first or sutural with a row of small, slightly elongate tubercles, somewhat smaller apically, little larger basally, the series arcuately diverging lateral to the scutellum to attain basal margin and there join first costa; second with a row of larger elongate, compressed tubercles which are at least twice as long as wide and quite semicircular in anteroposterior outline, obtusely rounded on summit, separated by an interval about equal to their width; tubercles of fourth and sixth intervals slightly less elongate, otherwise similar to those of the second, those of the eighth smaller, thinner and sharper at summit, while those of the tenth are still smaller, rounded, more or less atrophic and more widely spaced. Each elytron four-costate: these occurring on the third, fifth, seventh and ninth intervals, first three of about equal prominence, the fourth less so: first costa on third interval and formed by more or less coalescent larger compressed tubercles, most strongly confluent toward base, crenulate at summit; tubercles forming the third and fourth costæ less coalescent, those of the fourth sharp at summit. The first and second costæ attain the basal margin; the fourth and least

developed, feebly attains the humeri, and the third terminates a short distance behind the same. Apically the costæ terminate on the upper and arcuate part of the declivity at base of the lobe, the third joins the first, second ending between the two, fourth more or less obsolescent apically. Small curved setæ arise from the punctures at anterior extremity or between the coalescent tubercles on the costæ, between the discrete tubercles of the alternating series.

Undersurface of the body coarsely and densely punctate throughout. Legs moderate in length and rather slender.

Measurements: (Type) Length, 17 mm.; width, 5 mm.

Holotype, female, No. 2722, Museum California Academy of Sciences, in collection of E. C. Van Dyke, taken by him in July 1913, at Camp Nelson, Tulare County, California.

Paratypes in the collections of Dr. E. C. Van Dyke and F. E. Blaisdell, Museum of the California Academy of Sciences. Eleven in number. Ten collected by Dr. Van Dyke on July 6, 15, and 17, 1910, South Fork Kings River Canyon, altitude 5000 feet, and in Paradise Valley, Kings River, altitude 7000 feet, Fresno County, California. I take pleasure in dedicating this fine species to my friend and associate on many profitable collecting trips. Specimens were taken by J. C. Bradley on July 21 and 26, 1907, at an altitude of 6000 to 7000 feet in the Giant Forest, Sequoia National Park, Tulare County, California.

A very distinct species belonging to the *carinata* group of species. *Vandykei* differs from *carinata* Lec. by its less robust, more elongate and somewhat slender form, less coarsely and more densely sculptured elytra; the presence of well-marked rounded tubercles between the punctures of the strial series and the weak frontal carina arising less abruptly from the vertex. In *carinata* the form is more robust and the tubercles of the strial series are irregularly obsolete or more or less evident, rendering the discrete tubercles of the first to the eighth intervals inclusive more conspicuous. The type region for *carinata* Lec. is San Diego, California, but it occurs at least as far north as Santa Barbara, *segnis* Casey being identical and, therefore, a synonym. The smallest specimen of *vandykei*, evidently a male, measures 15.5 mm. in length and 5.5 mm. in width. Species of the *galeata* group have the inner or discal impression of the pronotum deeply foveate and conspicuous.

During the past few years a number of very interesting species of *Helops* have been collected and in greater abundance

than ever before. At the present time I am making known a species collected in 1910 by Dr. E. C. Van Dyke.

Helops fresnoënsis Blaisdell, n. sp.

Form elongate, obovate, widest a little behind the middle of the elytra, a little more than twice as long as wide. Color deep black, tarsi slightly piceous. Luster dull and somewhat sericeous.

Head subquadrate, widest across the eyes; sides before the latter, moderately strongly arcuate and convergent to the oblique suture; sides of the epistoma parallel and straight, apex transverse, angles slightly prominent anteriorly and narrowly rounded; frons broadly and quite strongly impressed on the frontal suture, slightly so against and in front of the eyes, moderately and transversely convex between the latter and somewhat so over the antennal fossæ, surface of the epistoma very feebly convex; densely and coarsely punctate, punctures not well defined on the vertex. Labrum transverse, lateral angles broadly rounded, very feebly and broadly sinuate at middle of apex, apical margin with a dense fringe of rather coarse ferruginous hairs; surface densely punctate, punctures irregular in size and smaller than on the frons. Eyes transverse, subreniform, three and three-fourths times wider than long, slightly and broadly emarginate behind the antennæ, upper lobe a fourth larger than the lower portion, rather coarsely faceted. Mentum transversely oblong, apex slightly and broadly emarginate; rather broadly and feebly subcarinate on median line, surface broadly and not very strongly impressed laterally; surface densely punctate, carina rather sparsely and irregularly punctate and more or less glabrous apically and basally. Antennæ long and slender, not incrassate, attaining the middle of the elytra; second joint small and as long as wide, third elongate and not quite four times as long as wide, five times as long as the second; fourth to the eighth inclusive obconical and elongate, equal in length and three times as long as wide, exclusive of the sixth which is a little longer than the seventh; ninth and tenth obconico-triangular, shorter, of about equal length and about a half longer than wide; eleventh oval, about a half longer than wide, slightly oblique, it and the tenth not quite as wide as the ninth. Last joint of the labial palpi quite quadrate apically, distinctly compressed, apex transverse. Last joint of the maxillary palpi subtriangular, no two sides equal, outer border about a third longer than the apical, which in turn is a little longer than the inner border.

Pronotum subquadrate, widest at apical third, about a fourth wider than long; apex truncate in less than moderate circular arc, bead obsolete at middle third, angles obtuse and slightly rounded; sides quite strongly arcuate in apical half, thence slightly convergent, straight to more or less broadly and feebly sinuate before the basal angles, marginal bead moderately coarse; base transverse, three-sevenths wider than apex, bead broad and flat, angles subrectangular and somewhat prominent; disk moderately convex, slightly and

rather broadly impressed within the basal angles, coarsely and densely punctate, punctures slightly less crowded in the central area, with an occasional small impunctate area, punctures extremely minutely setigerous.

Propleuræ and prosternum densely punctate, punctures similar to those of the pronotal disk. Prosternal process shining, sparsely, irregularly and coarsely punctate, quite horizontal and rectangular at apex.

Elytra about two-thirds longer than wide, widest behind the middle; base transverse, as wide as pronotal base, humeri obtuse and not in the least prominent; sides broadly and evenly arcuate to the obtusely ogival apex, noticeably convergent toward base; disk moderately strongly and evenly convex, arcuately declivous at the sides, obliquely so apically, most convex at the declivity; striæ of elongate linear punctures that are not impressed, intervals finely and irregularly punctate, surface more or less finely and irregularly creased. Scutellum about as long as wide, evenly arcuate apically, glabrous with few irregularly placed punctures in basal half.

Epipleuræ slightly concave at base, surface smooth, sparsely and very finely punctate and more or less wrinkled; basal margin slightly prominent and forming the humeral angle. Parapleuræ densely and coarsely punctate as are the propleuræ. Sternal punctures less defined, slightly less dense but otherwise similar.

Abdomen moderately convex, rather densely punctate, punctures smaller, separated by a distance equal to two or four times their diameter; sutures not impressed, second and third segments equal in length, fifth equal to the postcoxal part of the first, second three-fourths longer than the fourth; first and second segments more or less rugose laterally; first with a linear impression on the median line. Each puncture with a moderately long and subdecumbent hair. Legs rather long and slender; femora not swollen and similar; tarsi of moderate length, metatarsi equal to a little more than half the length of their femur.

Measurements: (Type) Length, 17 mm.; width, 7.2 mm.

Holotype, male, No. 2723, collection of E. C. Van Dyke, Museum California Academy of Sciences. Collected by him on July 4, 1910, on the slope of Lookout Peak, altitude 8000 feet, overlooking the South Fork of Kings River Canyon, Fresno County, California. One male paratype taken at the same time and place.

Fresnoënsis is apterous with the elytra connate at the suture, and belongs to the group of species that have the propleuræ densely punctate. It should follow *opaca* Lec. in our lists, from which it differs by the more elongate form, finer sculpturing and subsericeous luster. *Simulator* Blais. is more depressed,

pronotum less convex and broader, besides the functional wings are well developed. *Punctipennis* Lec. is smaller and depressed, elytra moderately striate and wings are present. *Spretus* Horn is moderately robust, elytra finely striate, punctation moderately coarse and the surface has a slight æneous luster. In the holotype the left metatibia and tarsus are missing.

A New Work on Hawaiian Insects

California entomologists will be interested in a "Handbook of the Insects and Other Invertebrates of Hawaiian Sugar-Cane Fields" recently published by the Hawaiian Sugar Planters' Association Experiment Station at Honolulu. The book, of 400 pages, was compiled and mostly written by Dr. F. X. Williams, formerly of San Francisco. The groups are treated systematically and are well illustrated by cuts. The book will serve as a very useful introduction to the insects of the Hawaiian Islands.—E. P. Van Duzee.

Our New Treasurer

The rapid development of the work at the University Farm at Davis and the distance from the place of publication, has led Dr. Freeborn to ask to be relieved from the duties of treasurer of the Pan-Pacific Entomologist. The publication committee, as well as the editor, feel under deep obligations to Dr. Freeborn, and to Professor F. H. Wymore who has handled the work while Dr. Freeborn was absent on sabbatical leave, for the faithful and efficient way in which they have handled the financial end of this undertaking for the past five years. Mr. E. R. Leach has very generously agreed to assume the duties of treasurer and for the present he will have a desk in the entomological department of the California Academy of Sciences, where all subscriptions and remittances should be addressed as follows:

"Mr. E. R. Leach, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California."—E. P. Van Duzee.

A NEW SPECIES OF BUPRESTIDÆ FROM CALIFORNIA[1]

(Coleoptera)

BY W. J. CHAMBERLIN
Forest Entomologist, Oregon State College

Glyptoscelimorpha viridis Chamberlin, n. sp.

Closely allied to *G. marmorata* Horn, which it resembles in shape, but is smaller, 7 to 7.5 mm. in length, 3.2 mm. in width. Dorsal surface metallic green, more pronounced in the male, and clothed with elongate, narrow, lemon-yellow scales. Head green, front coarsely, deeply punctate. Antennæ about one-third as long as body; segments 7 to 11 about as wide as long, terminal segment very much constricted, hardly one-quarter as large as the eleventh, amber-colored throughout. Scutellum almost triangular, more than twice as wide as long, shining, depressed in center. Thorax more than twice as wide as long, narrowed in front, sides sinuate, widest at middle and extreme base, disk deeply rather coarsely punctate. Elytra somewhat wider than the base of the thorax; surface deeply, coarsely, confluently punctate. Ventral surface shining cupreous but having a whitish appearance due to the thick coating of scales overlaying a coppery ground color. Legs amber-colored.

This species is at once distinguishable by its smaller size, the length being 7 to 7.5 mm. This is the length given by Dr. Horn for *G. marmorata,*[2] but in measuring more than a dozen examples of the latter it was found to have an average length of 9 mm. The greenish appearance is very distinct from the bronze of *G. marmorata* and the clothing of yellow scales in place of the white or cream-colored hairs or pubescence, together with the antennal segments, 7 to 11, being almost as wide as long, the constricted twelfth segment and the coarse confluent punctures set it off at a glance.

In Dr. Horn's description of the genus, he states that the third joint of the antennæ is longer than the first, whereas it is hardly as long in either of the species and in the females it is distinctly shorter. The broad scutellum is not oval, as the posterior margin has a central lobe extending to the rear.

Four specimens, one male and three females, are before me. One female has the scales more grayish than yellow, otherwise

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1 Published as technical paper No. 166 with the approval of the director of the Oregon Agricultural Experiment Station. A contribution from the department of entomology.

2 1893. Horn, G. H., Trans. Amer. Ent. Soc., Vol. XX, pp. 137-138.

there is no variation in the specimens. The male is at once distinguishable by having a very deep cleft in the last ventral abdominal segment.

The 12-segmented antennæ and the very peculiar lobed tarsal segments, as well as the wing venation, would indicate that this genus does not belong in the family Buprestidæ.

The type locality of *G. viridis* is Palmdale, California. The host is probably *Juniperus californicus*. Type in the author's collection. Other specimens in the collection of Mr. Kenneth Sloop of Pasadena, California.

Note on the Redwood Scale

The redwood scale, *Aonidia shastæ* Coleman, was first taken on Giant Sequoia trees at Atwell Mills, near Sequoia National Park, in April 1931, by K. A. Salman and J. M. Miller, Bureau of Entomology, U. S. Department of Agriculture. It occurred in great numbers on the leaves and stems of certain young second-growth trees only in more or less shady areas along the highway, where road dust contributed to the discomfort of the infested trees. Additional material was also furnished by Mr. Miller in August 1931, from the same locality. Specimens were referred to Prof. G. F. Ferris, who determined them as the above. This scale was originally taken on McNab Cypress at Clear Creek, near Shasta, California, August 29, 1901, by G. A. Coleman, who described it as *Aspidiotus coniferarum* var. *shastæ*.[1] Other specimens were also taken by Coleman on Gowen cypress in Lake County of the same year. In 1920 G. F. Ferris recorded[2] it on the coast redwood, "at times in great abundance, always on the leaves." Ferris also calls attention to the fact that the species was described by C. L. Marlatt as *Aonidia juniperi* from specimens taken on juniper in Utah.

According to Miller the insect has not been observed on normal trees and there is no present indication that it will ever become a serious pest of the giant redwood.—E. O. Essig.

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1 Jour. N. Y. Ent. Soc., Vol. 11, p. 67 (1903).

2 Stanford Univ. Pub., Univ. ser., Biol. Sci., Vol. 1, pp. 54, 55 (1920).